The Effects of a Parsimonious Vocabulary and Comprehension Intervention on Content and Reading Achievement

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- The views expressed do not necessarily reflect those of the U.S. Department of Education.

- This presentation combines findings from the second and third years of research from project: *Examining the Effects of a Content- and Case-based Professional Development Model on Teachers' Practices and Students' Comprehension and Content Acquisition.*

The Challenges of Social Studies Text

- By 4th grades, students are expected to "read to learn" (Chall & Jacobs, 2003).
- Social studies text presents multiple obstacles to reading comprehension:
  - Unfamiliar topics (e.g., Native Americans of the Coastal Plains)
  - Unfamiliar vocabulary (e.g., nomad, migratory)
  - Complex text structure
- Many teachers are underprepared to help students navigate the complexities of content-area text.

Towards a Better Understanding of Effective and Efficient Reading Comprehension Interventions

- Results of National Reading Panel (2000) and Rand Study Group (2002) recommend multiple strategies to promote reading comprehension.
- We must not only better understand what types of interventions are effective but which are efficient and feasible?
- Few studies have contrasted the effects of single focus (content vocabulary to comprehension) to multi-focus interventions.

Purpose of Current Study

- Compare the efficacy of a "hybrid" professional development/intervention package designed to increase students' vocabulary knowledge and comprehension of social studies text.
- Build on the evidence-base in reading comprehension and vocabulary.
- Use best practices of professional development.
- Situate strategies in the curriculum and content of classrooms.

Research Questions

- What are the effects of the hybrid intervention when compared to typical practice on 4th grade students' vocabulary, content, and comprehension outcomes?

- What are the effects of the hybrid intervention when compared to single-focus (vocabulary and comprehension) intervention models?

Setting, Participants, and Group Assignment

Year 1

2 school districts
15 schools
49 teachers
896 students

Vocabulary	Comprehension	Typical Practice
6 schools 17 teachers 319 students	5 schools 18 teachers 329 students	4 schools 14 teachers 248 students

Year 2

Hybrid
2 school districts
11 schools
35 teachers
340 students

Three Unit Hybrid Intervention

Core Practices	Unit 1	Unit 2	Unit 3
Text Preview	• Text selection provided • Big idea provided • Questions provided	• Text selected by the teacher • Questions are teacher-generated	
Vocabulary Instruction	•Vocabulary selection completed by teacher prior to instruction •Vocabulary Maps	•Context Clues introduced	•Context Clues applied independently
Question Generation	•Question generation introduced	•Questions generated by students with support	•Questions generated by students
Main Idea and Summaries	•GIST statements introduced		•Grow the GIST—use longer sections of text
Practice Activities	•Vocabulary Wall Activities •Ready, Set, Go •Vocabulary Jeopardy		

Intervention Procedures Across Conditions

- Interventions (vocabulary, comprehension, or hybrid) consisted of three 6-week units of instruction.
- Intervention was implemented for 18 weeks.
- Recommended intervention time was 30 minutes 3 times per week or for a total of 90 minutes.
- Conducted in social studies classrooms.
- Teachers received 12-15 hours of professional development distributed throughout the intervention.

Student Measures

Measure	Purpose	Administration		
		Pre-test	Post-test	Each 6 weeks
Gates-McGinitie Test of Reading Comprehension	Standardized measure used to assess students' knowledge of commonly used words in content area texts.	X	X	
Curriculum-based Measure for Social Studies: Vocabulary Matching	Researcher-developed measure to assess fluency and growth of vocabulary knowledge.	X	X	
Social studies content tests	District-developed measure to assess knowledge of social studies content.			X
Texas Assessment of Knowledge and Skills-Reading (TAKS)	State assessment measure of reading comprehension used as a covariate in the analyses.			

Teacher Measures

Measure	Purpose	Administration		
		Pre-test	Post-test	Each 6 Weeks Unit
Teacher Recordings of Lessons	Assess fidelity Assess instructional quality.			X
Teacher Questionnaires	Rate quality of professional development and interventions components. Report differences in instructional practice and knowledge.	X	X	

Analysis Plan

- Multiple imputations were conducted using Monte-Carlo Marchov-Chains (MCMC). All analyses were conducted using ten imputed data sets with the statistics reported averaged across these imputations.
- The modeling method was Structural Equation Modeling (SEM) with a Hierarchical Linear Modeling (HLM) structure.
  - Structural Equation Modeling was used to model the multivariate responses.
  - Hierarchical Linear Modeling with clustering at the classroom level to account for nesting of students in classrooms.
- Analyses were conducted using Mplus 5.2 (Muthén & Muthén, 1998-2008).

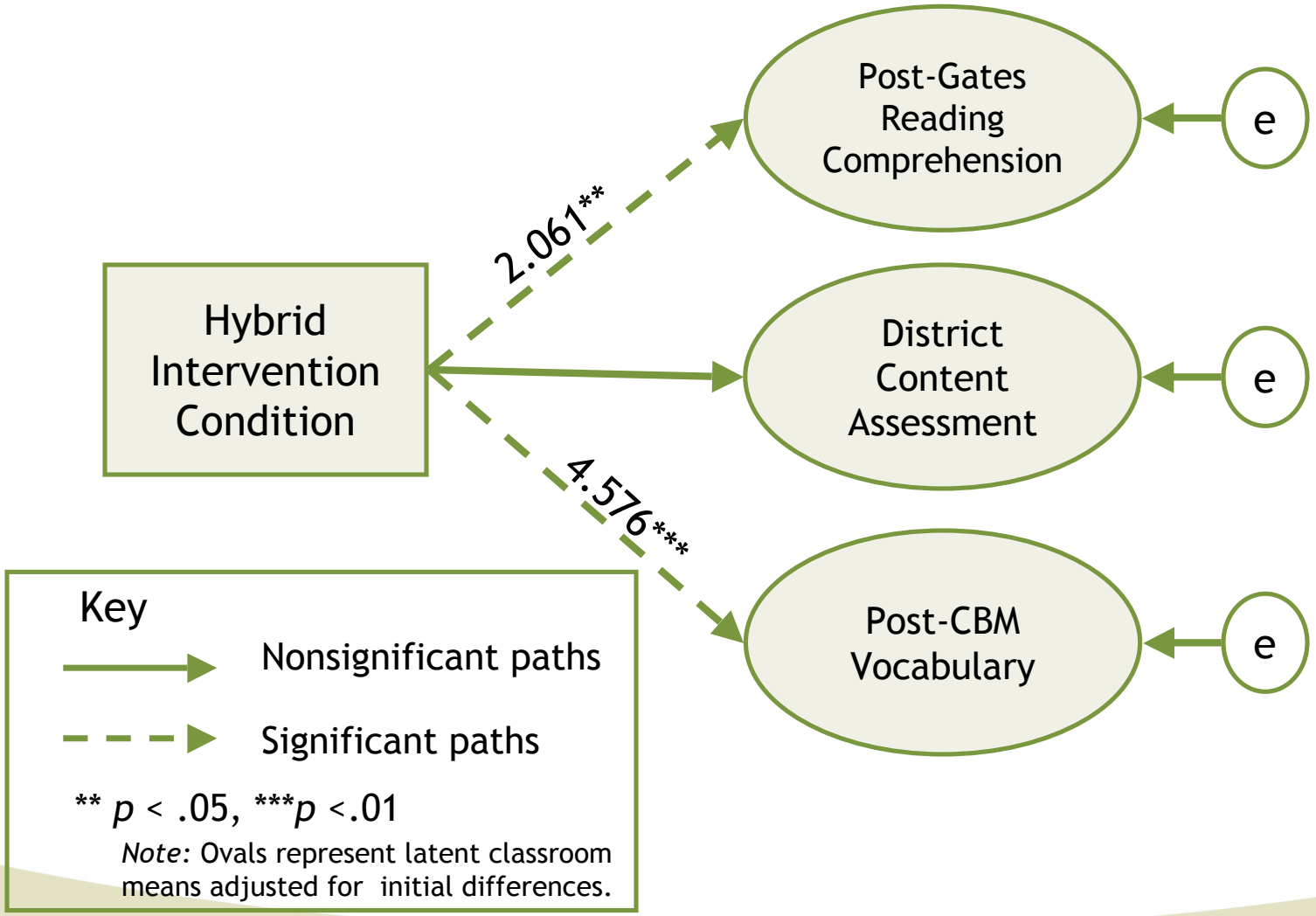
Model 1 Sample: Hybrid to Historical Comparison

Hybrid Condition (Year 2)	
Teachers	Students
31	311
Historical Comparison (Year 1)	
Teachers	Students
14	229

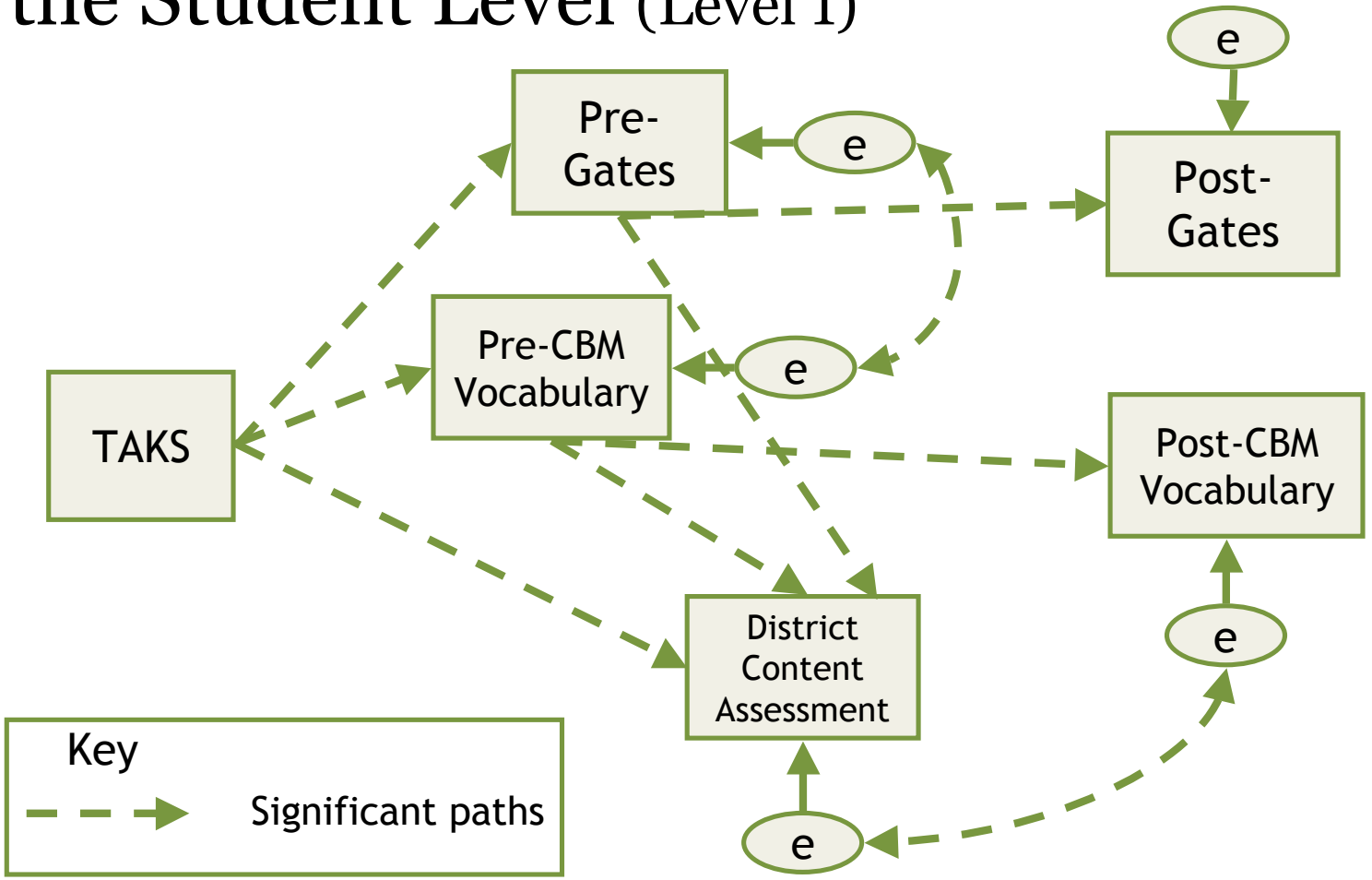
Fit Statistics of Model 1: Hybrid to Historical Comparison

Fit statistic	Average over 10 imputations	Recommended Cutoff
X^2/df	3.107	<8
CFI	0.996	>.9
TFI	0.957	>.9
RMSEA	0.059	<.8
SRMR(within)	0.016	<.5
SRMR(between)	0.033	<.5

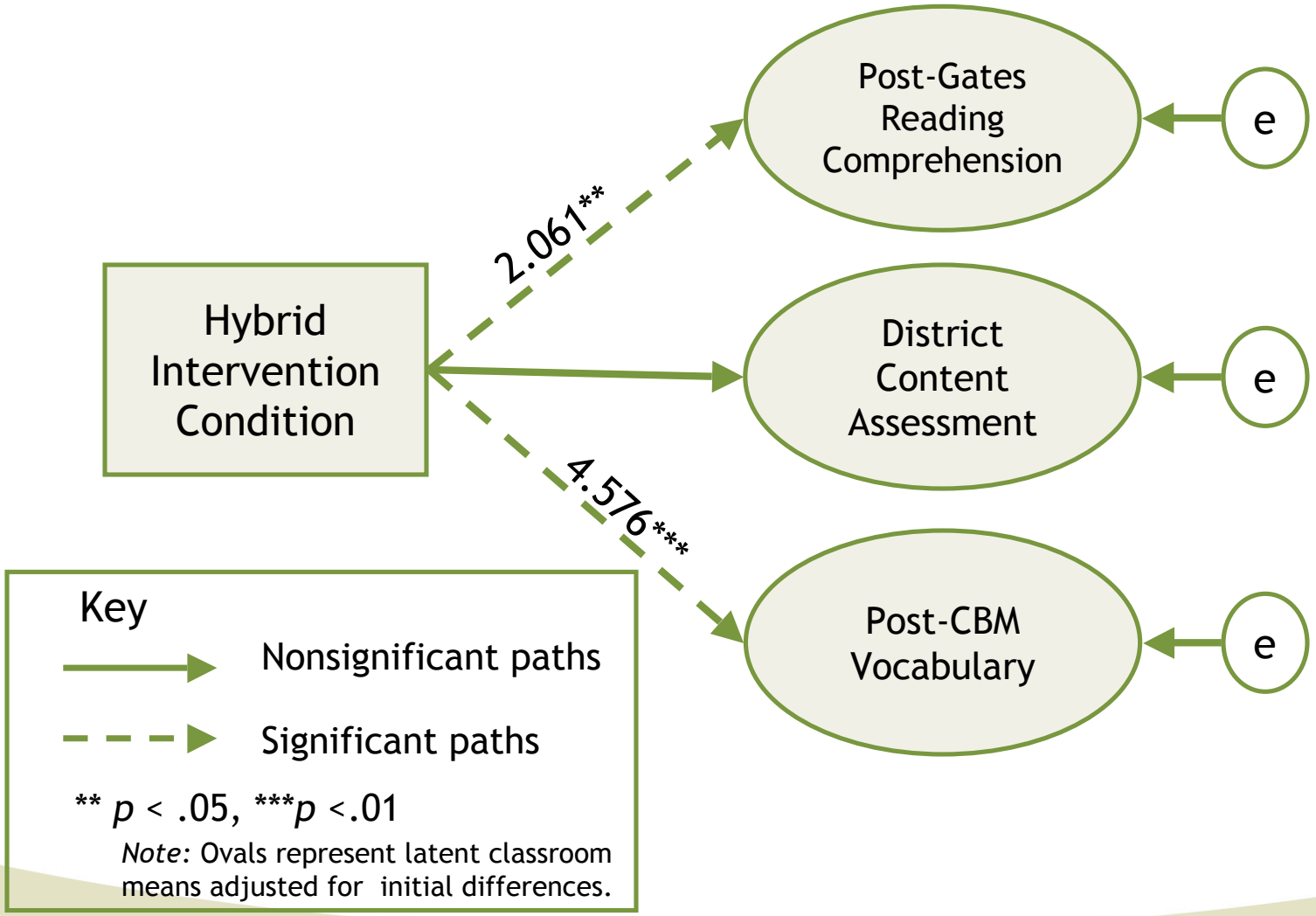
SEM Model of Hybrid Intervention compared to Historical Comparison at the Classroom Level (Level 2)



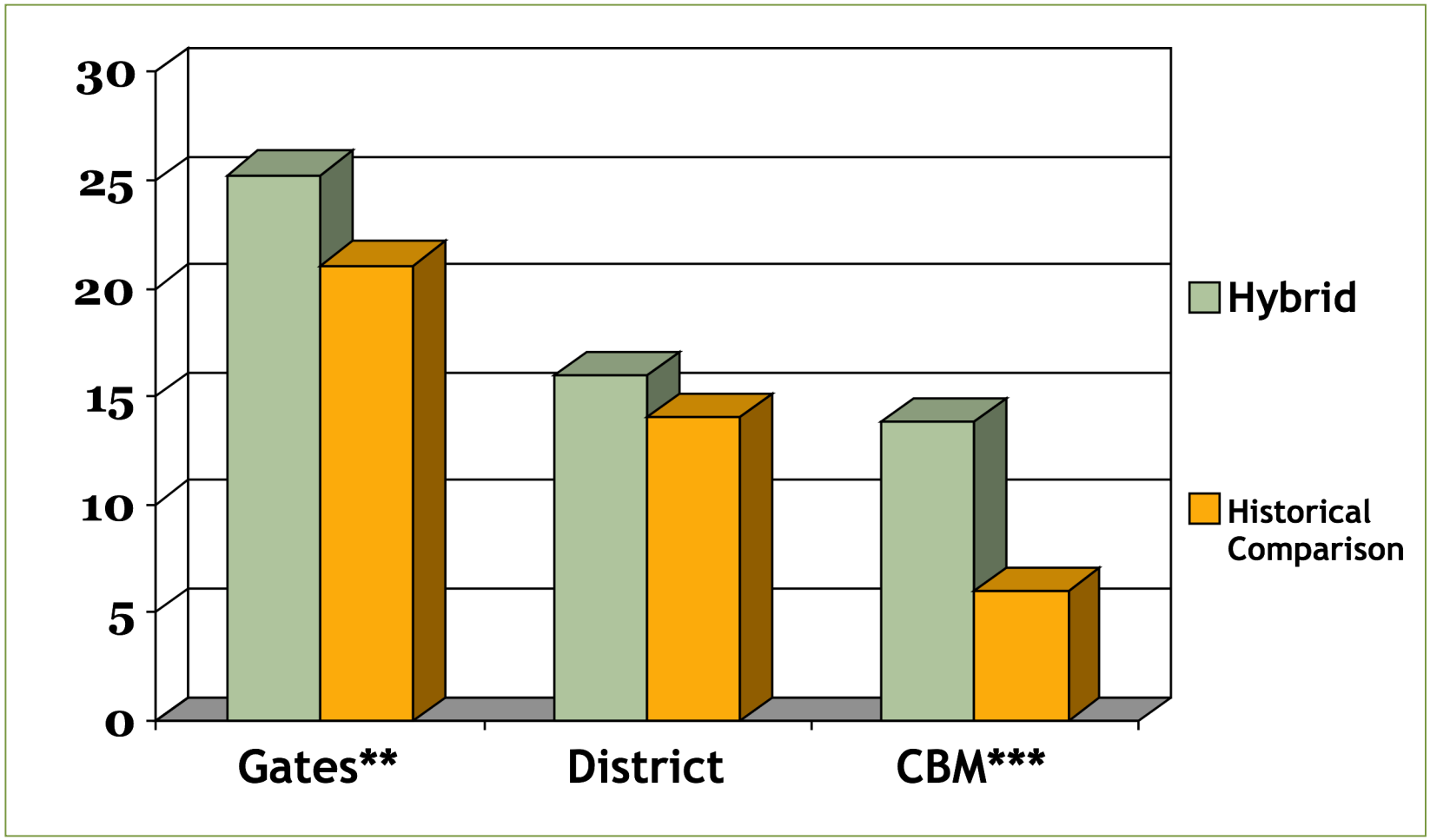
SEM Model of Hybrid Intervention compared to Single-Focus Interventions at the Student Level (Level 1)



SEM Model of Hybrid Intervention compared to Historical Comparison at the Classroom Level (Level 2)



Bar Graph of Post-test Raw Means for Model 1



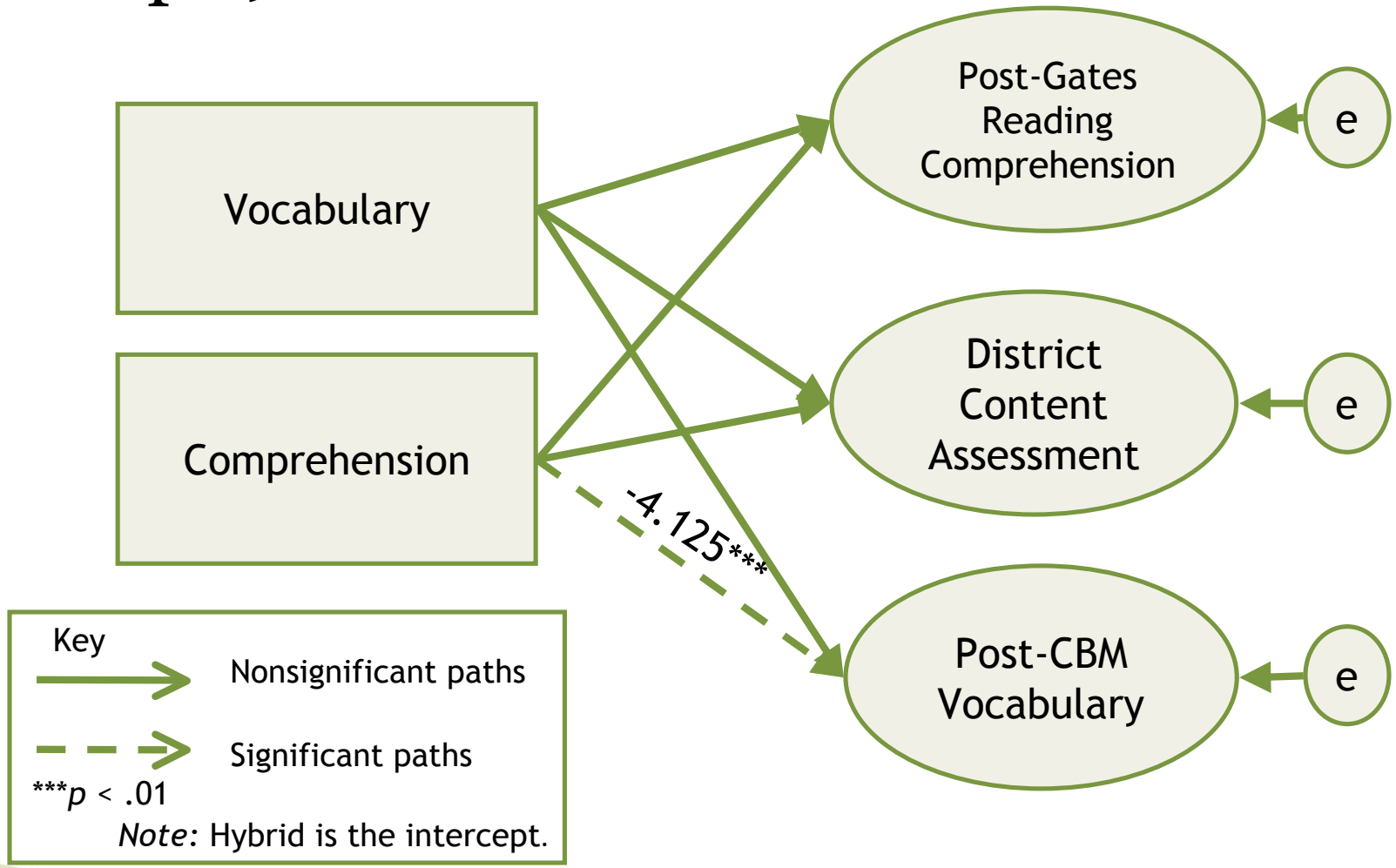
Model 2 Sample: Hybrid to Historical

Hybrid Condition (Year 2)	
Teachers	Students
21	183
Vocabulary-Only Condition (Year 1)	
Teachers	Students
19	346
Comprehension-Only Condition (Year 1)	
Teachers	Students
17	321

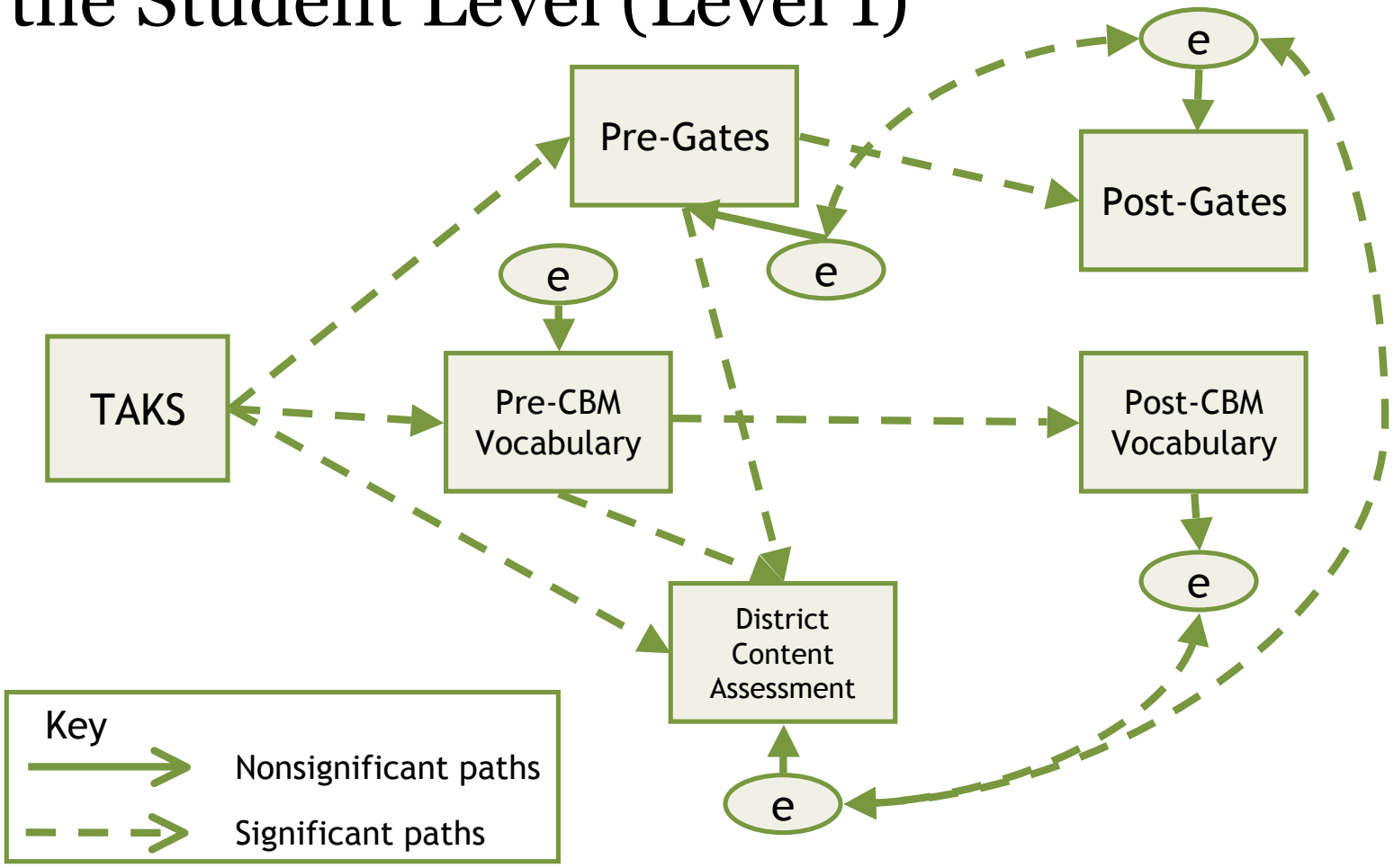
Fit Statistics of Model 2: Hybrid to Historical Comparison

Fit statistic	Average of 10 imputations	Recommended Cutoff
X^2/df	3.638	<5
CFI	0.996	>.9
TFI	0.957	>.9
RMSEA	0.055	<.08
SRMR(within)	0.013	<.08
SRMR(between)	0.045	<.08

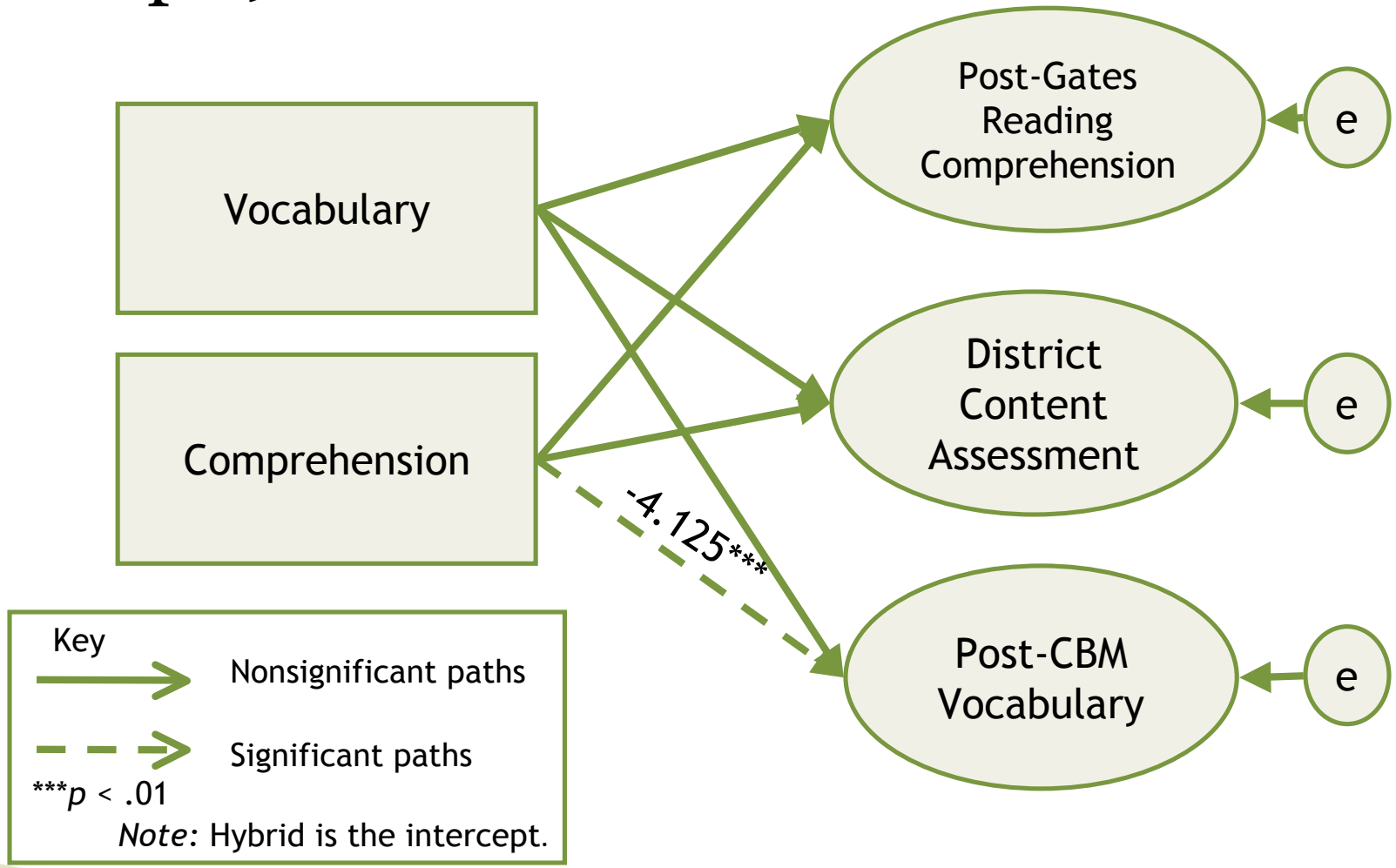
SEM Model of Hybrid Intervention to Single-Focus Interventions (Study 1 sample) at the Classroom Level (Level 2)



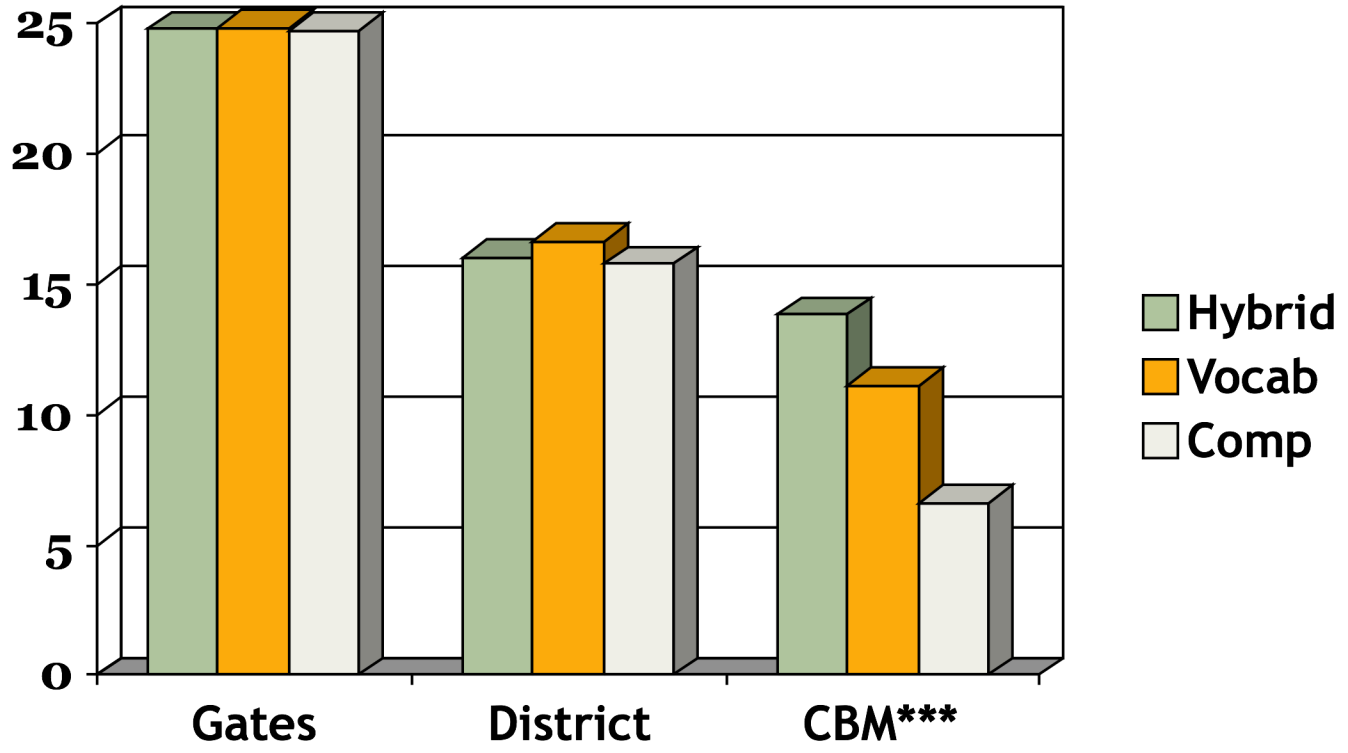
SEM Model of Hybrid Intervention compared to Single-Focus Interventions at the Student Level (Level 1)



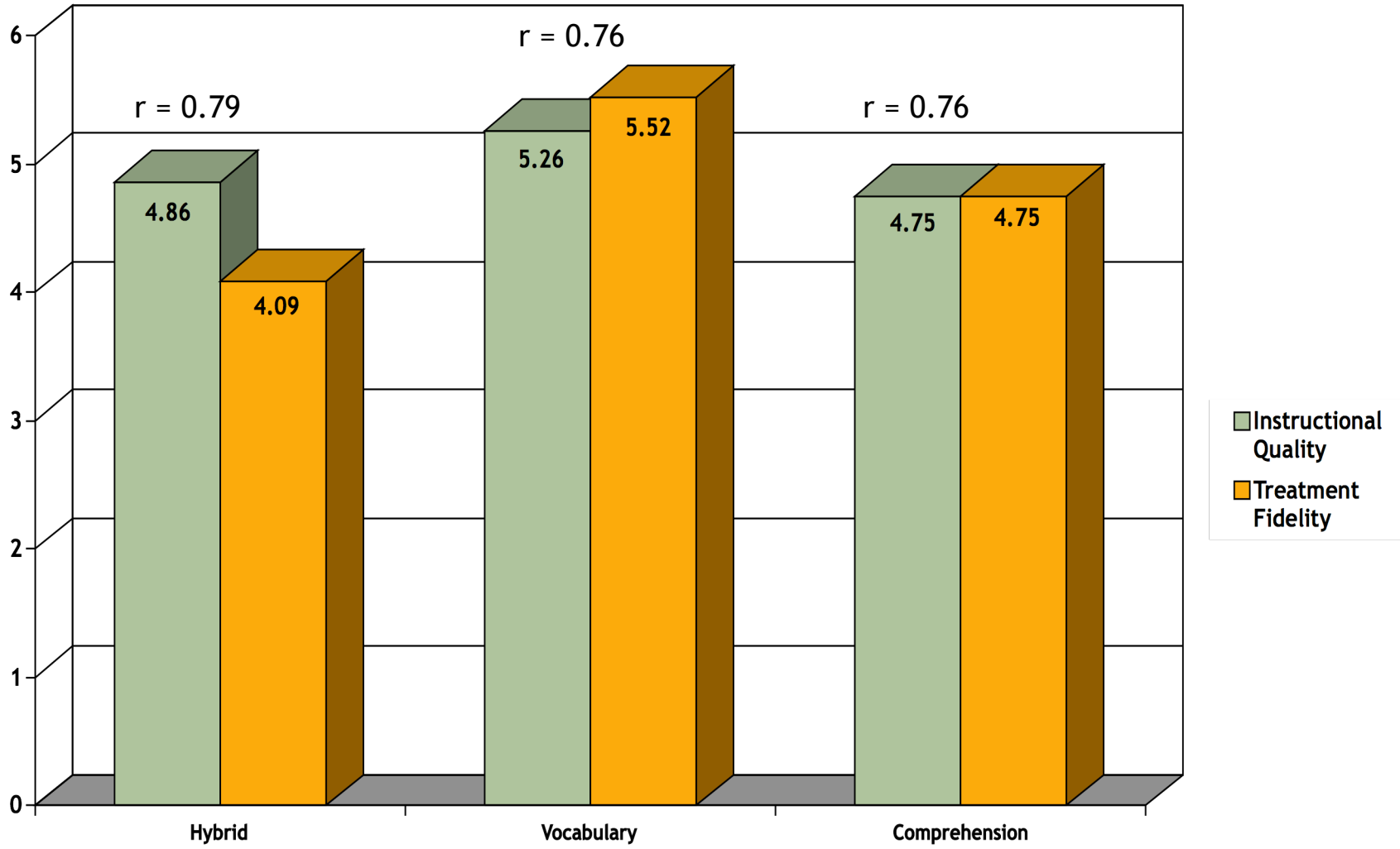
SEM Model of Hybrid Intervention to Single-Focus Interventions (Study 1 sample) at the Classroom Level (Level 2)



Bar Graph of Post-test Raw Means for Model 2



Bar Graph of Mean Instructional Quality and Fidelity Across Conditions



Note: Range of Fidelity and Instructional Quality is 1-7.

Conclusions: *Hybrid vs. Typical Practice*

- The combination intervention was sufficiently robust to impact both comprehension and vocabulary.
  - Some comprehension focus resulted in significant outcomes on standardized measure of comprehension.
  - Some vocabulary focus resulted in significant outcomes on CBM.
  - Hybrid did not impact district content tests.

Conclusions: *Hybrid vs. Single Dimension*

- Conditions were comparable on standardized comprehension and content measures.
- The only significant difference favored hybrid over comprehension-only on CBM.
  - Some vocabulary focus (single or hybrid) is more effective than comprehension-only focus.

Issues to Investigate: Intervention

- Instructional efficiency and coherence
  - What is the optimal design to promote acquisition and transfer of teaching and learning strategies?
  - Can we be more effective & efficient by drawing upon samenesses in language arts and social studies?
  - What are the discipline specific factors that should be considered?
- Neither intervention fidelity nor instructional quality were significantly related to outcomes.

Issues to Investigate: Professional Development

- What level of professional development is needed to attain optimal results?
- How to introduce strategies (complete versus component)?
- What are the relative benefits of dimensions of the PD package?

Issues to Investigate: Measurement

- Student Learning: The tension between technically adequate and instructionally meaningful assessments.
- How to validly measure whether students learn content
  - CBM-vocabulary
- How to measure whether students learn strategies
  - Standardized comprehension measures

A copy of the Power Point presentation can be downloaded at:

http://www.meadowscenter.org/files/SREE2009Final.pdf

Appendix

Comprehension Core Practices

Research Based Concept	Application in this Study
Main idea as building block for summarization	Gist Growing the Gist
Asking and answering questions with emphasis on higher-level questioning	Ask & answer questions at several predetermined points in lesson
Use graphic organizers to represent key learning	Student learning log

Vocabulary Core Practices

Research Based Concept	Application in this Study
Contextual analysis, specifically the use of context clues	Context "CLUE" strategy
Combination Interventions • Explicit teaching • Cognitive strategies • Contextual/morphemic analysis	Series of activities completed weekly • picture cues • word associations • word building
Semantic Organizers	Vocabulary Maps

Descriptive Data for Model 1
(Hybrid vs.. Typical Practice)

	Hybrid	Typical Practice
TAKS	2227.07 (161.76)	2230.14 (152.10)
Gates-MacGinitie Pre (raw scores)	19.30 (9.75)	15.48 (8.90)
Gates-MacGinitie Post (raw scores)	25.23 (10.40)	21.08 (10.11)
Curriculum-based Vocabulary Pre	5.76 (3.63)	0.96 (1.27)
Curriculum-based Vocabulary Post	13.84 (7.27)	5.96 (5.61)
District Content Assessment	15.96 (4.99)	14.06 (4.40)

Descriptive Data for Model 2 (Hybrid vs. Comprehension-only and Vocabulary-only)

	Hybrid	Comprehension	Vocabulary
TAKS	2268.43 (161.27)	2267.42 (162.66)	2271.81 (165.64)
Gates-MacGinitie Pre (raw scores)	18.86 (9.95)	19.14 (9.55)	19.25 (9.82)
Gates-MacGinitie Post (raw scores)	24.79 (10.5)	24.71 (10.17)	24.82 (10.50)
Curriculum-based Vocabulary Pre	5.76 (3.61)	0.95 (1.26)	0.93 (1.27)
Curriculum-based Vocabulary Post	13.84 (7.27)	6.62 (5.89)	11.11 (7.41)
District Content Assessment	16.05 (5.02)	15.78 (4.66)	16.62 (4.33)